



## Smart Street Light System

[1] Sanjay M, [2] Mr. K. Vivekanandan

[1]UG Scholar, Department of Computer Technology, Sri Krishna Adithya College of Arts & Science

[2] Assistant Professor, Department of Computer Technology, Sri Krishna Adithya College of Arts & Science

### ABSTRACT—

This project aims for designing and executing the advanced development in embedded systems for energy saving of street lights. Currently we have a manual system where the street lights will be switched ON in the evening before the sunsets and they are switched OFF in the next day morning after there is sufficient light on the outside. But the actual timing for these lights to be switched ON is when there is absolute darkness. With this, the power will be wasted up to some extent. This project gives solution for electrical power wastage [2]. Also the manual operation of the lighting system is completely eliminated. The proposed system provide a solution for energy saving and street light automation. The street light system is checking the weather for street lamp ON/OFF condition. The weather is light or dark are sense through a LDR sensor, If the weather is light, the system will OFF. If the weather is dark, the light system will ON.

**Keyword:** *IoT-based, Wireless module, sensors, transmission, LDR Sensor, light system.*

## 1. INTRODUCTION

The street lighting system is the one of the largest energy expenses for a city. A smart street light system can reduce the corporation street lighting costs. Recently however with the increasing importance for saving power and proper maintenance are leading to develop a latest techniques and technologies which permit significant power savings and larger respect for the environment and more effective management. In this system gives the solution to those problems.

An automatic street light system using sensors and wireless modules for implement a system. The LDR(light dependent resistor) sensing the environment. The system can identify the light or dark environment using LDR. The environment is dark the system allows to ON the street lights. The environment is light the system allows to OFF the street lights. Same this LDR operation is used to find the light fault detection. The GSM module is used to send the SMS to the users for the light faulty condition. At the same time we can access the street light system status from the cloud system environment through a Wi-Fi module. So, we can access the street light status in anywhere and anytime.

## 2. HARDWARE SPECIFICATION

- **NodeMCU**

NodeMCU is an open-source firmware for which open-source prototyping board designs are available. The name “NodeMCU” combines “node” and “MCU” (micro-controller unit).



The firmware uses the Lua scripting language. The firmware is based on the eLua project and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS. Due to resource constraints, users need to select the modules relevant for their project and build a firmware tailored to their needs. Support for the 32-bit ESP32 has also been implemented.

- **LDR SENSOR**



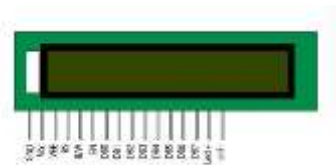
The snake like track shown below is the Cadmium Sulphide (CdS) film which also passes through the sides. On the top and bottom are metal films which are connected to the terminal leads. It is designed in such a way as to provide maximum possible contact area with the two metal films. The structure is housed in a clear plastic or resin case, to provide free access to external light.

- **CURRENT SENSOR**



A current sensor is a device that detects electric current in a wire, and generates a signal proportional to that current. The generated signal could be analog voltage or current or even a digital output. The generated signal can be then used to display the measured current in an ammeter, or can be stored for further analysis in a data acquisition system, or can be used for the purpose of control. A unique hinge and locking snap allows attachment without interrupting the current-carrying wire. High secondary turn will develop signals up to 10Vac across a burden resistor. A unique hinge and locking snap allows attachment without interrupting the current-carrying wire. High secondary turn will develops.

- **LCD DISPLAY**



LCD displays are one of the most sophisticated display devices used by them. Once you learn how to interface it, it will be the easiest and very reliable output device used by you! More, for micro controller based project, not every time any debugger can be used. So LCD displays can be used to test the outputs.

- **POWER SUPPLY**



This module controls the water pump and checks the water level in both the top tank and the sump tank. It allows the feature since the pump may be operated manually or automatically.

- **LED BULB**



LED lighting differs from incandescent and fluorescent in several ways. When designed well, LED lighting is more efficient, versatile, and lasts longer.

---

## EXISTING SYSTEM

Manual street light systems are the traditional way of lighting streets and public areas. These systems typically consist of a network of poles that are installed along the street, each with a light fixture at the top. These fixtures contain a light bulb and a reflector that is designed to direct light downwards onto the street. The lights are controlled manually by a switch or a timer.

In a manual street light system, the lights are turned on at dusk and turned off at dawn. In some cases, the lights may also be turned on during cloudy or overcast days. The timing of the lights is typically controlled by a timer, which can be adjusted to accommodate changes in daylight hours throughout the year..

---

## DRAWBACKS

- Manual Switching off/on of Street Lights
- More Energy Consumption.
- High expense.
- More manpower.

---

## PROPOSED SYSTEM

- A smart street light system is a proposed solution for urban areas that aims to improve energy efficiency and reduce costs. The system is designed to automatically adjust lighting levels based on the time of day and weather conditions, using sensors and intelligent control algorithms. This approach can significantly reduce energy consumption, while also ensuring that the lighting is always at an optimal level for safety and visibility. Additionally, smart street light systems can incorporate features such as motion sensors, which can detect movement and activate the lights in real-time, further enhancing safety and security. The implementation of a smart street light system can bring numerous benefits, including reduced energy consumption, improved safety, and lower maintenance costs.
- Additionally, the system can be remotely monitored and controlled, allowing for faster detection and resolution of any issues with the lights. Overall, a smart street light system has the potential to improve the quality of life for residents while also reducing energy consumption and costs for cities..

---

## ADVANTAGES

- The street light ON/OFF automatic and manually based on LDR sensor.
- Lightning system also reduces crime say murder, theft and plenty of more to a great- extend.
- Maintenance Cost Reduction.

---

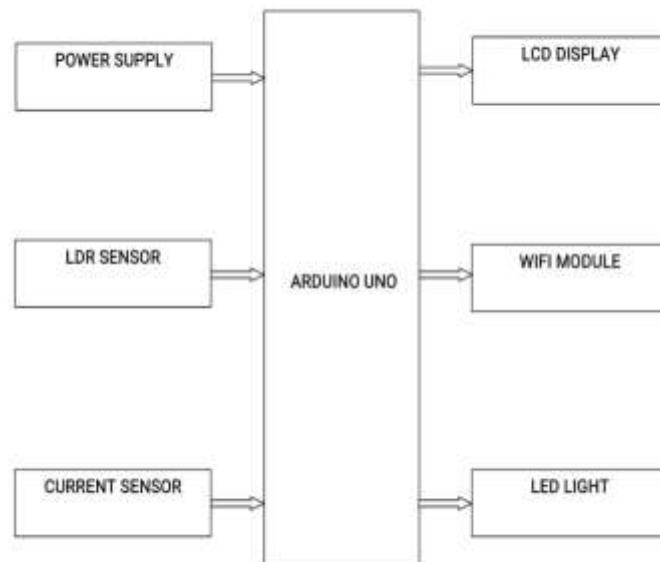
## FEATURES

Smart street lights are equipped with a range of advanced features that help to improve energy efficiency, reduce maintenance costs, and enhance public safety. One of the key features of smart street lights is their ability to automatically adjust their brightness based on real-time traffic and weather conditions. This means that the lights can be dimmed when there are fewer cars or pedestrians on the road, and brightened up when there is heavy traffic or bad weather.

Smart street lights can also be equipped with sensors that detect motion, allowing them to turn on and off automatically as people and vehicles pass by. This not only helps to save energy but also makes the streets safer by ensuring that areas are well-lit when there are people around.

Another feature of smart street lights is the ability to remotely monitor and control them. This means that maintenance crews can be alerted when a light is not working, and can quickly dispatch a repair team to fix the problem. Additionally, street lights can be programmed to operate on specific schedules or triggered by events such as emergencies or festivals.

## SYSTEM BLOCK DIAGRAM



## METHODOLOGY FOR SENSORS

Smart street light technology utilizes a variety of sensors to improve energy efficiency and enhance public safety. These sensors include motion sensors, ambient light sensors, and infrared sensors. Motion sensors detect the presence of vehicles, pedestrians, and cyclists, and activate the lights only when required, thus reducing energy waste. Ambient light sensors detect the level of natural light present and adjust the street light output accordingly, optimizing energy consumption. Infrared sensors can be used to detect the presence of animals or intruders, and trigger alerts or adjust the lighting accordingly to enhance public safety. All of these sensors work together to create a more efficient and effective lighting system for public streets.

## WORKING METHODOLOGY OF THIS SYSTEM

A smart street light system is a modern lighting solution that utilizes advanced technologies such as sensors, wireless communication, and cloud computing to optimize the functionality and energy efficiency of street lighting. The system is designed to automatically adjust the brightness of the street lights based on real-time data such as ambient light levels, traffic flow, and pedestrian activity. This helps to reduce energy consumption and lower operational costs, while also improving the safety and comfort of pedestrians and drivers. The system is typically controlled through a central management platform that allows administrators to monitor and control the lighting remotely, and to receive alerts and notifications in the event of any issues or malfunctions. Overall, a smart street light system represents a significant upgrade over traditional street lighting solutions, and offers numerous benefits to cities and municipalities seeking to improve their infrastructure and services.

## CONCLUSION & FUTURE SCOPE

In this survey, we analyze that IoT has groomed rapidly with our day to day life. Smart Street light System is one of the major parts which uses IoT concepts. Smart Street Lighting System clearly tackles the major problems like Energy wastage, Crime detection, disposal of incandescent lamps, maintenance cost etc., This system ensures traffic safety and the security to the people which can stop from women annoyance, burglaries and further intimidations count of money conserved over time is quite significant.

## REFERENCES

[1] Mohd. Saifuzman, and Nazmun Nessa Moon, Femaz Narin Nur. "IoT Based Street Lighting and Traffic Management System". IEEE Region 10 Humanitarian Technology Conference(R10-HTC), 2017.

- 
- [2] B.Abinaya, S.Gurupriya, and M.Pooja, "IoT Based ASED Smart and Adaptive Lighting in Street Lights". Second International Conference on Computing and Communications Technologies (ICCCT'17), 2017.
- [3] Lakshmana Phaneen manguluri, Yashwanth Sri Venkatesh sorapalli, Lokesh kumar Nakkala, and Venkat Tallari, "Smart Street Lights Using IoT", International conference on applied and Theoretical Computing and Communication Technology, 2017.
- [4] M. Kokilavani, and A. Malathi, "Smart Street Lighting System using IoT", International Journal of Advanced Research in Applied Science and Technology, Vol.3, No.11, 2017, pp. 8- 11.
- [5] Parkash, Prabu V, and Dandu Rajendra, "Internet of Things Based Intelligent Street Lighting System for Smart City". International Journal of Innovative Research in Science, Engineering and Technology, Vol. 5, No. 5, 2016, pp. 7685- 7691.